west virginia department of environmental protection

Division of Air Quality
601 57th Street, SE
Charleston, WV 25304-2345
Phone: 304 926 0475 • Fax: 304 926 0479

Jim Justice, Governor
Austin Capterton, Cabinet Secretary
www.dep.wv.gov

BACKGROUND INFORMATION

Application No.:	R13-3285B
Plant ID No.:	085-00055
Applicant:	Antero Midstream LLC
Facility Name:	Lafferty Compressor Station
Location:	County Road 10/4 Pennsboro, Ritchie County
SIC/NAICS Code:	4923/221210
Application Type:	Class II Administrative Update
Received Date:	February 16, 2017
Engineer Assigned:	Mike Egnor
Fee Amount:	$300
Date Received:	February 13, 2017
Complete Date:	March 7, 2017
Due Date:	May 6, 2017
Applicant's Ad Date:	February 22, 2017
Newspaper:	*The Pennsboro News*
UTM's:	508.091 km Easting • 4,341.658 km Northing • Zone 17
Latitude/Longitude:	39.22418/-80.90627
Description:	Administrative update primarily to: (1) The pigging events were increased from 52 and separated into 198 low pressure pigging venting and 260 high pressure pigging venting events per year; (2) Increase the number of compressor blowdown/startups from 132 to 936 events per year. These changes will result in an increase of a Potential to Emit (PTE) of 9.63 TPY of VOC's, 0.25 TPY of HAP's, and 915 TPY of carbon dioxide equivalents.

DESCRIPTION OF PROCESS/MODIFICATIONS

Existing (As-Permitted) Facility

The Lafferty Compressor Station is located in Ritchie County, West Virginia. Gas from surrounding pipelines enter the facility through one (1) receiver and associated slug catcher. From there, the gas is metered and routed through a filter separator. Any produced liquids from the scrubber or separator are sent to the 500 barrel settling tank (TK-9000). Gas from the filter separator is sent to one (1) of eight (8) 2,500 hp compressor engines (C-2100 – C-2170). The eight (8) compressor engines are controlled by oxidation catalysts (1C – 8C). Fuel gas for the compressor engines is treated prior to the engines by a fuel conditioning skid with a 0.5 MMBtu/hr heater (FUEL1) to allow more complete combustion. Produced fluids are routed to the settling tank and high pressure gas is sent to one of the two (2) TEG dehydrators.

Each TEG dehydrator contains a flash gas tank (FT-3110 & FT-3210) and 1.5 MMBtu/hr reboiler (R-3110 & R-3210). Each dehydrator has a design rate of 110 MMscf/day. Within the dehydrator unit, vent gas from the flash gas tank (FT-3110 & FT-3210) is routed to the reboiler (R-3110 & R-3210) and used as fuel. In the case where the flash tank gas cannot be used by the reboiler due to excess gas or the reboiler being offline, the gas will be sent to the vapor recovery units (VRU-6000 and VRU-6100) via the storage tanks (TK-9000 through TK-9210) and thus controlled by 98%. Combustion emissions from each reboiler are routed to the atmosphere. The dehydrator still vents (SV-3110 & SV-3210) are controlled by a flare with at least 98% control efficiency (FL-1000). Produced fluids from the dehydrator are routed to the settling tank. The dry gas from the dehydration process is either routed to a fuel gas scrubber, metered, and routed to the compressors as fuel gas or metered and sent to the high pressure facility discharge pipeline.

All produced fluids enter one (1) 500 barrel settling tank (TK-9000) where the fluids settle out as either condensate or produced water. The produced water goes to two (2) 400 barrel produced water tanks (TK-9100 – TK-9110) and the condensate goes to two (2) 400 barrel condensate tanks (TK-9200 – TK-9210). Flashing only occurs at the settling tank as the fluids stabilize in the settling tank before going to the other storage tanks. All five (5) tanks are connected to a primary vapor recovery unit (VRU-6000) where tank vapors are collected and recycled back into the gas system right before the initial filter scrubber. A second vapor recovery unit (VRU-6100) is used as back-up to the primary vapor recovery unit. The produced fluids are trucked out via tanker trucks as needed (LDOUT1). The loading emissions are uncontrolled. The anticipated production is 150 barrels per day of condensate and 45 barrels per day of produced water. One (1) 600 kWe microturbine generator is used at the facility. The Capstone C600 unit is comprised of three (3) 200 kWe units that can be operated individually. Likely, all three units will not be operating 8,760 hours per year; however, emissions were calculated as such for maximum flexibility. The fuel line for the generators is heated by a small catalytic heater (CATHT1) with a burner rating of 24 Btu/hr.

Fugitive emissions from component leaks and emissions from venting or blowdown events also occur.

Proposed Modifications

Antero is now proposing to modify the existing facility by:

- The facility had 52 pigging venting events per year. The pigging venting has been separated into one low pressure receiver at 198 events per year and one high pressure receiver at 260 events per year.

- Increase the number of compressor blowdown/startups from 132 to 936 events per year.

SITE INSPECTION

On March 30, 2016, Joe Kessler conducted an inspection of the proposed location of the Lafferty Compressor Station (the facility has not yet been inspected by the DAQ Compliance/Enforcement Section.). The proposed Lafferty site is located in a rural area of Ritchie County approximately 5.4 miles southeast of Pennsboro, WV just east of White Oak Road (County Route 10/4). The writer was accompanied on the inspection by Ms. Lou Ann Lee, Environmental Coordinator with Antero. Observations from the inspection include:

- The proposed facility will lie atop a hill approximately 5.4 miles southeast of Pennsboro, WV. The area is rural in nature with scattered homes and farms within several miles of the proposed location;

- At the time of the inspection, no substantive work had been undertaken at the site;

- The occupied dwelling located nearest to the proposed site is approximately 0.25 miles west of the proposed site along White Oak Road; and

- *Directions:* [Latitude: 39.22418, Longitude: -80.90627] From the intersection of United States (US) Route 50 and State Route (SR) 74 (Pullman Drive), travel south on SR 74 for approximately 1.3 miles and then turn left onto CR 7/1 (Lynn Camp Road). Follow the Lynn Camp Road for approximately 4.1 miles and then turn left onto White Oak Drive (CR 10/4). Travel on White Oak Road for approximately 0.3 miles to the compressor station located at the top of a small hill.

AIR EMISSIONS AND CALCULATION METHODOLOGIES

Antero included in Attachment N of the permit application air emissions calculations for the increased pigging and blowback/shutdown events. Those included were compressor blowdown/startup events (from 132 to 936 events/year for each) and "pigging" events (from 26 to a split of 198 low pressure pigging venting and 260 high pressure pigging venting events/year). The amount of gas released per event was taken from "engineering based on other facilities." VOC/HAP by-weight percentages of the natural gas were based on a representative gas analysis.

EMISSIONS SUMMARY

The following is the change in fugitive emissions from venting episodes as a result of this administrative update:

Type of Event	R13-3285A VOC Emissions (tons/year)	R13-3285B VOC Emissions (tons/year)	Change (tons/year)
Compressor Blowdown	5.80	8.30	+ 2.50
Compressor Startup	0.61	4.32	+ 3.71
Plant Shutdown	0.88	0.88	0
Pigging Venting	0.23	3.65	+ 3.42
Total VOC Emissions	7.51	17.14	+ 9.63

Pollutant	R13-3285A Emissions (lbs/year)	R13-3285B Emissions (lbs/year)	Change (lbs/year)
Benzene	5.4	12.2	+ 6.8
Toluene	9.0	20.0	+ 11.0
Ethylbenzene	0.01	0.02	+ 0.01
Xylene	1.52	3.4	+ 1.88
n-Hexane	380	860	+ 480
Total HAPs	395.93	895.62	+ 499.69

Pollutant	R13-3285A Emissions (tons/year)	R13-3285B Emissions (tons/year)	Change (tons/year)
Carbon Dioxide Equivalent	713.69	1,628.7	+ 915.01

REGULATORY APPLICABILITY

This section will address the potential regulatory applicability/non-applicability of substantive state and federal air quality rules relevant to the emission units/sources added or modified at the Lafferty Compressor Station.

45CSR13: Permits for Construction, Modification, Relocation and Operation of Stationary Sources of Air Pollutants, Notification Requirements, Administrative Updates, Temporary Permits, General Permits, and Procedures for Evaluation

The proposed modification of the Lafferty Compressor Station does have have the potential to increase a regulated pollutant (see the tables above) in excess of the thresholds that would, pursuant to §45-13-2.17, define the changes as a "modification" under 45CSR13. Therefore, the proposed changes are eligible to be reviewed as a Class II Administrative Update.

As required under §45-13-8.3 ("Notice Level A"), Antero placed a Class I legal advertisement in a "newspaper of general circulation in the area where the source is . . . located." The ad ran on July 20, 2016 in The Pennsboro News and the affidavit of publication for this legal advertisement was submitted on August 5, 2016.

45CSR14: Permits for Construction and Major Modification of Major Stationary Sources of Air Pollution for the Prevention of Significant Deterioration - (NON APPLICABILITY)

The Lafferty Compressor Station is located in Ritchie County, WV. Ritchie County is classified as "in attainment" with all National Ambient Air Quality Standards. Therefore, as the facility is not a "listed source" under §45-14-2.43, the individual major source applicability threshold for all pollutants is 250 TPY. As given in Attachment A, the revised post-modification facility-wide PTE of the Lafferty Compressor Station is less than 250 TPY for all criteria pollutants. Therefore, the facility is not defined as a "major stationary source" under either 45CSR14 and the rule does not apply.

45CSR27: To Prevent and Control the Emissions of Toxic Air Pollutants - (NON APPLICABILITY)

Pursuant to §45-27-3.1, the "owner or operator of a plant that discharges or may discharge a toxic air pollutant into the open air in excess of the amount shown in the Table A [of 45CSR27] shall employ [Best Available Technology] at all chemical processing units emitting the toxic air pollutant." As calculated from Table 1 above, the aggregate PTE of formaldehyde generated by the compressor engines is greater than 0.5 TPY - greater than the 1,000 pound per year threshold given in Table A of 45CSR27. However, internal combustion engines do no meet the definition of "chemical processing units" under §45-27-2.4 and, therefore, they are not subject to BAT under 45CSR27.

45CSR30: Requirements for Operating Permits - (NON APPLICABILITY)

45CSR30 provides for the establishment of a comprehensive air quality permitting system consistent with the requirements of Title V of the Clean Air Act. The modified Lafferty Compressor Station does not meet the definition of a "major source under §112 of the Clean Air Act" as outlined under §45-30-2.26 and clarified (fugitive policy) under 45CSR30b. The proposed facility-wide PTE (see Attachment A) of any regulated pollutant does not exceed 100 TPY. Additionally, the facility-wide PTE does not exceed 10 TPY of any individual HAP or 25 TPY of aggregate HAPs. It should be noted that the facility does have a facility wide PTE of over 97 TPY of VOC's. The facility also has an additional 3.44 TPY of fugitive VOC emissions. 45CSR30B-3.1 states that fugitive emissions shall be included in the total for those source categories listed in 45CSR§30-2.26b. One source category is "Natural gas processing facilities".

After speaking with a Compliance/Enforcement supervisor and an experienced NSR permit engineer, it was explained that natural gas doesn't get "processed" until it gets to the stage where the material components are separated. Therefore according to this logic, a well pad and/or compressor station is not a "Natural gas processing facility" and do not count fugitive emissions towards their total for Title V applicability.

40CFR60 Subpart OOOOa: Standards of Performance for Crude Oil and Natural Gas Production, Transmission and Distribution for which Construction, Modification or Reconstruction Commenced after September 18, 2015

Fugitive Emissions Components

Pursuant to §60.5365a(j), "[t]he collection of fugitive emissions components at a compressor station, as defined in §60.5430a, is an affected facility." The Leak Detection and Repair (LDAR) requirements for a compressor station are given under §60.5497a.

TOXICITY OF NON-CRITERIA REGULATED POLLUTANTS

This section provides an analysis for those regulated pollutants that are emitted from the modified Lafferty Compressor Station and that are not classified as "criteria pollutants." Criteria pollutants are defined as Carbon Monoxide (CO), Lead (Pb), Oxides of Nitrogen (NO_x), Ozone, Particulate Matter (PM_{10} and $PM_{2.5}$), and Sulfur Dioxide (SO_2). These pollutants have National Ambient Air Quality Standards (NAAQS) set for each that are designed to protect the public health and welfare. Other pollutants of concern, although designated as non-criteria and without national concentration standards, are regulated through various federal and programs designed to limit their emissions and public exposure. These programs include federal source-specific Hazardous Air Pollutants (HAPs) limits promulgated under 40 CFR 61 (NESHAPS) and 40 CFR 63 (MACT). Any potential applicability to these programs were discussed above under REGULATORY APPLICABILITY.

The majority of non-criteria regulated pollutants fall under the definition of HAPs which, with some revision since, were 188 compounds identified under Section 112(b) of the Clean Air Act (CAA) as pollutants or groups of pollutants that EPA knows or suspects may cause cancer or other serious human health effects. The following table lists each HAP identified by Antero with a facility-wide PTE above 0.05 TPY (100 lbs/year) affected by this administrative update and the associated carcinogenic risk (as based on analysis provided in the Integrated Risk Information System (IRIS)):

HAPs – Carcinogenic Risk			
HAPs	Type	Known/Suspected Carcinogen	Classification
n-Hexane	VOC	No	Inadequate Data

AIR QUALITY IMPACT ANALYSIS

The estimated maximum emissions of the modified facility are less than applicability thresholds that would define the proposed facility as "major" under 45CSR14 and, therefore, no air quality impacts modeling analysis was required. Additionally, based on the nature and location of the proposed source, an air quality impacts modeling analysis was not required under §45-13-7.

CHANGES TO R13-3285A

The following substantive changes were made to Permit Number R13-3285B:

1) Condition 4.1.12.d has been renumbered 4.1.12.g.

2) Condition 4.1.12.c was revised to increase the number of compressor blowdowns and compressor startups from 132 each to 936 each per year on a rolling 12 month rolling average. The pigging events were increased from 52 and separated into 198 low pressure pigging venting and 260 high pressure pigging venting events per year on a rolling 12 month rolling average. This has resulted in new Conditions 4.1.12.d through f.

3) The provision in Condition 4.1.12.c to show compliance by limiting total annual gas released to less than 3,485 mscf has been removed. Current Condition 4.2.9 already requires the permittee to monitor and record the events and estimate amounts in Conditions 4.1.12.c through f.

4) Condition 4.2.9 has been revised to include Conditions 4.1.12(c) through (f)

5) New Condition 4.5.2 requires the Permittee to report any exceedances of Permit Conditions 4.1.12.c through f in writing to the Director as soon as practicable, but within (10) days of the occurrence.

6) Revised Conditions 2.4.1 and 2.5.1 to identify the update of this Permit to R13-3285B.

MONITORING, COMPLIANCE DEMONSTRATIONS, REPORTING, AND RECORDING OF OPERATIONS

The revised fugitive venting emissions related to this administrative update already has 40CFR60, Subpart OOOOa fugitive emission requirements. Condition 4.2.9 requires monitoring and recordkeeping. New Condition 4.5.2 requires reporting to the Director for any exceedances of Conditions 4.1.12(c) through (f).

PERFORMANCE TESTING OF OPERATIONS

The draft permit contains performance testing requirements primarily based on the applicable requirements contained in the recently issued G35-C General Permit. The requirements are given under Section 4.3 of the draft permit and may be reviewed at that location. There were no substantive changes to the performance testing requirements as a result of the proposed changes evaluated herein.

RECOMMENDATION TO DIRECTOR

The information provided in the permit application indicates that compliance with all applicable state and federal air quality regulations will be achieved. Therefore, I recommend to the Director the issuance of a Permit Number R13-3285B to Antero Midstream LLC for the proposed modification of the Lafferty Compressor Station located near Pennsboro, Ritchie County, WV.

Mike Egnor
Engineer

3/28/17
Date